

این دیتاشیت توسط توکل الکترونیک تهیه و ارائه شده است.
جهت مشاهده قیمت، موجودی و ثبت سفارش این قطعه به وبسایت توکل الکترونیک مراجعه فرمایید.



مشاهده قیمت و خرید
برای خرید و مشاهده سایر محصولات کلیک کنید



BUK7L06-34ARC

TrenchPLUS standard level FET

Rev. 03 — 3 December 2003

Product data

1. Product profile

1.1 Description

N-channel enhancement mode field-effect power transistor in a plastic package using TrenchMOS™ technology, featuring very low on-state resistance, integral gate resistor, ESD protection diodes and clamping diodes that are guaranteed to prevent the MOSFET avalanching.

1.2 Features

- ESD and overvoltage protection
- Internal gate resistor
- Q101 compliant
- On-state resistance 5.1 mΩ (typ).

1.3 Applications

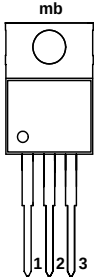
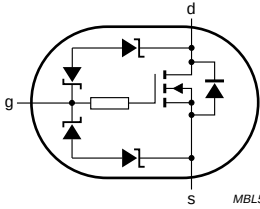
- 12 V loads
- Motors, lamps and solenoids.

1.4 Quick reference data

- $V_{DSR(CL)} = 41\text{ V (typ)}$
- $I_D \leq 147\text{ A}$
- $R_{DS(on)} = 5.1\text{ m}\Omega\text{ (typ)}$
- $P_{tot} \leq 250\text{ W}$.

2. Pinning information

Table 1: Pinning - SOT78C, simplified outline and symbol

Pin	Description	Simplified outline	Symbol
1	gate (g)		
2	drain (d)		
3	source (s)		
mb	mounting base, connected to drain (d)		

MBL370

SOT78C (TO-220)

MBL521

3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BUK7L06-34ARC	TO-220	Plastic single-ended package; heatsink mounted; 1 mounting hole; 3 leads.	SOT78C

4. Limiting values

Table 3: Limiting values

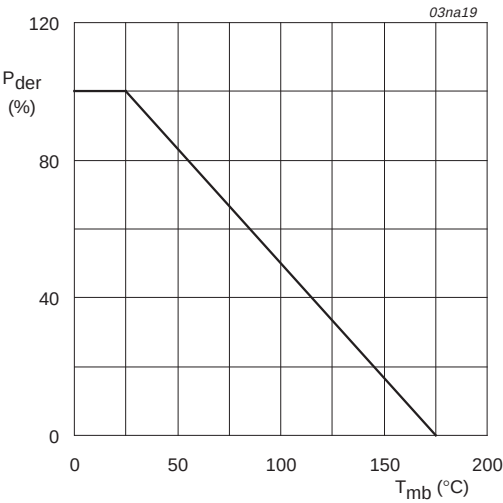
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage (DC)		[1] -	34	V
V_{DGR}	drain-gate voltage (DC)	$R_{GS} = 20 \text{ k}\Omega$	[1] -	34	V
V_{GS}	gate-source voltage (DC)		[1] -	± 20	V
I_D	drain current (DC)	$T_{mb} = 25 \text{ }^\circ\text{C}$; $V_{GS} = 10 \text{ V}$; Figure 2 and 3	[2] -	147	A
			[3] -	75	A
		$T_{mb} = 100 \text{ }^\circ\text{C}$; $V_{GS} = 10 \text{ V}$; Figure 2	[2] -	103	A
I_{DM}	peak drain current	$T_{mb} = 25 \text{ }^\circ\text{C}$; pulsed; $t_p \leq 10 \text{ }\mu\text{s}$; Figure 3	-	590	A
P_{tot}	total power dissipation	$T_{mb} = 25 \text{ }^\circ\text{C}$; Figure 1	-	250	W
$I_{DG(CL)}$	drain-gate clamping current	$t_p = 5 \text{ ms}$; $\delta = 0.01$	-	50	mA
$I_{GS(CL)}$	gate-source clamping current	continuous	-	10	mA
		$t_p = 5 \text{ ms}$; $\delta = 0.01$	-	50	mA
T_{stg}	storage temperature		-55	+175	$^\circ\text{C}$
T_j	junction temperature		-55	+175	$^\circ\text{C}$
Source-drain diode					
I_{DR}	reverse drain current (DC)	$T_{mb} = 25 \text{ }^\circ\text{C}$	[2] -	147	A
			[3] -	75	A
I_{DRM}	peak reverse drain current	$T_{mb} = 25 \text{ }^\circ\text{C}$; pulsed; $t_p \leq 10 \text{ }\mu\text{s}$	-	590	A
Avalanche ruggedness					
$E_{DS(CL)S}$	non-repetitive drain-source clamped energy	clamped inductive load; $I_D = 75 \text{ A}$; $V_{DS} \leq 34 \text{ V}$; $V_{GS} = 10 \text{ V}$; starting $T_j = 25 \text{ }^\circ\text{C}$	-	1.0	J
Electrostatic discharge					
V_{esd}	electrostatic discharge voltage; all pins	human body model; $C = 100 \text{ pF}$; $R = 1.5 \text{ k}\Omega$	-	8	kV
		human body model; $C = 250 \text{ pF}$; $R = 1.5 \text{ k}\Omega$	-	8	kV

[1] Voltage is limited by clamping.

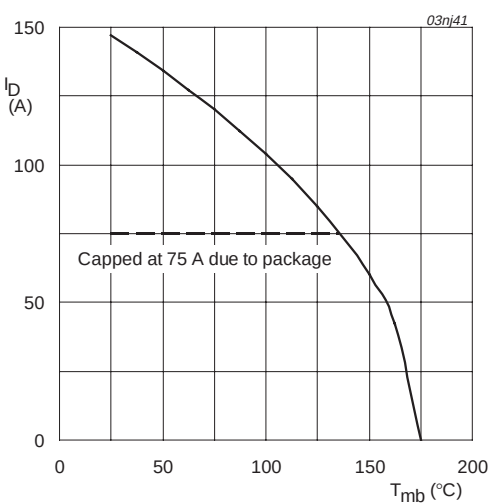
[2] Current is limited by power dissipation chip rating.

[3] Continuous current is limited by package.



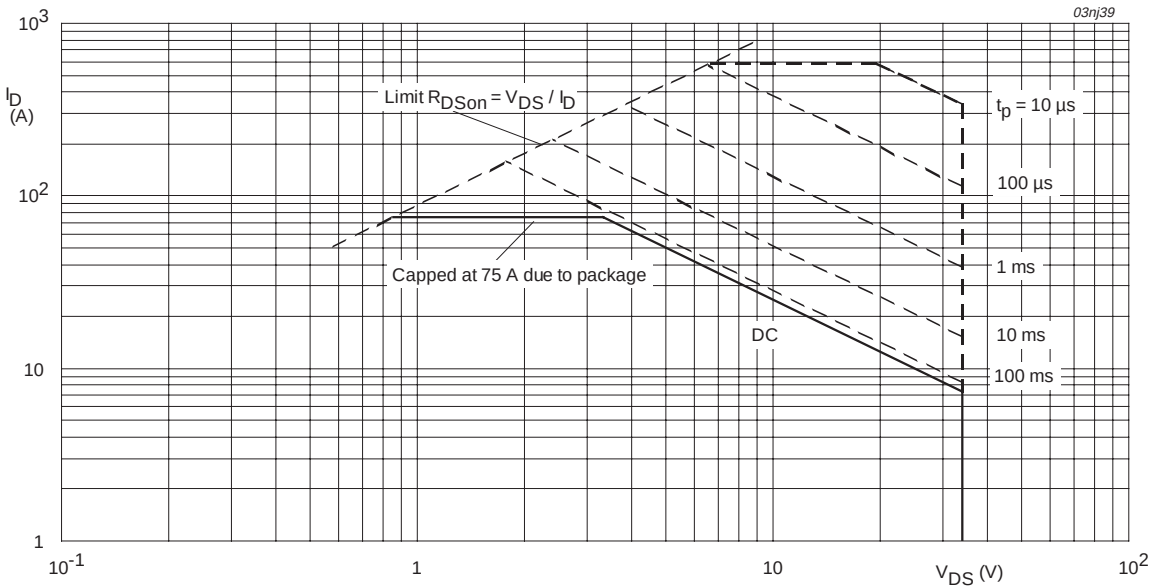
$$P_{der} = \frac{P_{tot}}{P_{tot(25^{\circ}C)}} \times 100\%$$

Fig 1. Normalized total power dissipation as a function of mounting base temperature.



$V_{GS} \geq 10$ V

Fig 2. Continuous drain current as a function of mounting base temperature.



$T_{mb} = 25$ °C; I_{DM} single pulse.

Fig 3. Safe operating area; continuous and peak drain currents as a function of drain-source voltage.

5. Thermal characteristics

Table 4: Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	vertical in still air	-	60	-	K/W
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Figure 4	-	0.33	0.60	K/W

5.1 Transient thermal impedance

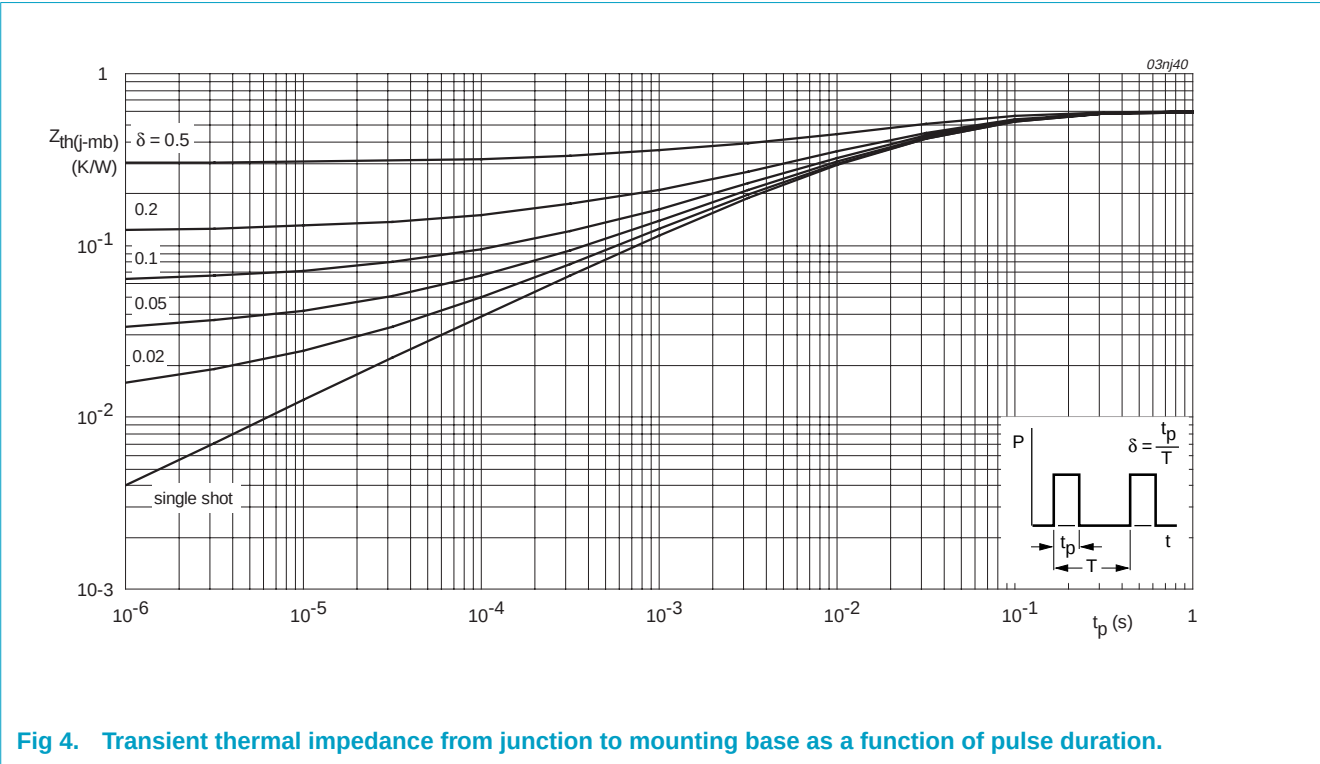


Fig 4. Transient thermal impedance from junction to mounting base as a function of pulse duration.

6. Characteristics

Table 5: Characteristics

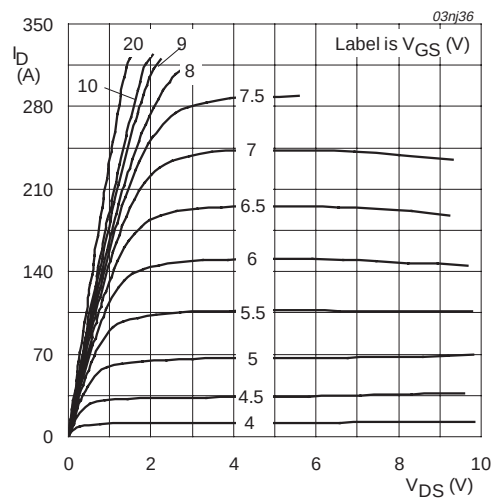
$T_j = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
$V_{(BR)DG}$	drain-gate zener breakdown voltage	$I_D = 2\text{ mA}$; $V_{GS} = 0\text{ V}$ $T_j = 25\text{ °C}$	34	-	45	V
		$T_j = -55\text{ °C}$	34	-	45	V
$V_{DSR(CL)}$	drain-source clamping voltage (DC)	$I_{GS(CL)} = -2\text{ mA}$; $I_D = 1\text{ A}$ [1] Figure 16 and 17	-	41	-	V
$V_{GS(th)}$	gate-source threshold voltage	$I_D = 1\text{ mA}$; $V_{DS} = V_{GS}$; Figure 9				
		$T_j = 25\text{ °C}$	2.2	3	3.8	V
		$T_j = 175\text{ °C}$	1.2	-	-	V
		$T_j = 150\text{ °C}$	1.5	-	-	V
		$T_j = -55\text{ °C}$	-	-	4.2	V
I_{DSS}	drain-source leakage current	$V_{DS} = 16\text{ V}$; $V_{GS} = 0\text{ V}$ $T_j = 25\text{ °C}$	-	0.1	2	μA
		$T_j = 150\text{ °C}$	-	5	50	μA
		$T_j = 175\text{ °C}$	-	30	250	μA
$V_{(BR)GSS}$	gate-source breakdown voltage	$I_G = \pm 1\text{ mA}$; $-55\text{ °C} < T_j < +175\text{ °C}$	20	22	-	V
I_{GSS}	gate-source leakage current	$V_{GS} = \pm 10\text{ V}$; $V_{DS} = 0\text{ V}$ $T_j = 25\text{ °C}$	-	5	1000	nA
		$T_j = 175\text{ °C}$	-	-	50	μA
		$V_{GS} = 16\text{ V}$; $V_{DS} = 0\text{ V}$ $T_j = 175\text{ °C}$	-	-	150	μA
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = 10\text{ V}$; $I_D = 30\text{ A}$; Figure 7 and 8 $T_j = 25\text{ °C}$	-	5.1	6	m Ω
		$T_j = 175\text{ °C}$	-	-	11.4	m Ω
		$V_{GS} = 16\text{ V}$; $I_D = 30\text{ A}$		4.0	5.3	m Ω
R_G	Internal gate resistor		-	11	-	Ω
Dynamic characteristics						
$Q_{g(tot)}$	total gate charge	$V_{GS} = 10\text{ V}$; $V_{DS} = 27\text{ V}$; $I_D = 25\text{ A}$; Figure 14	-	82	-	nC
Q_{gs}	gate-source charge		-	15	-	nC
Q_{gd}	gate-drain (Miller) charge		-	31	-	nC
C_{iss}	input capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 25\text{ V}$; $f = 1\text{ MHz}$; Figure 12	-	3400	4533	pF
C_{oss}	output capacitance		-	1080	1296	pF
C_{rss}	reverse transfer capacitance		-	660	904	pF

Table 5: Characteristics...continued $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

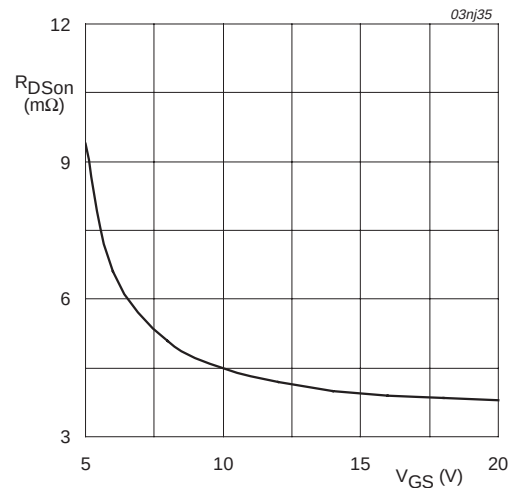
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_{d(on)}$	turn-on delay time	$V_{DS} = 30\text{ V}; R_L = 1.2\text{ }\Omega;$ $V_{GS} = 10\text{ V}; R_G = 10\text{ }\Omega$	-	27	-	nS
t_r	rise time		-	108	-	nS
$t_{d(off)}$	turn-off delay time		-	196	-	nS
t_f	fall time		-	167	-	nS
L_d	internal drain inductance	measured from drain lead 6 mm from package to center of die	-	4.5	-	nH
		measured from contact screw on mounting base to center of die SOT78C	-	3.5	-	nH
L_s	internal source inductance	measured from source lead to source bond pad	-	7.5	-	nH
Source-drain diode						
V_{SD}	source-drain (diode forward) voltage	$I_S = 10\text{ A}; V_{GS} = 0\text{ V};$ Figure 15	-	0.85	1.2	V
t_{rr}	reverse recovery time	$I_S = 20\text{ A}; dI_S/dt = -100\text{ A}/\mu\text{s}$	-	62	-	ns
Q_r	recovered charge	$V_{GS} = -10\text{ V}; V_{DS} = 30\text{ V}$	-	44	-	nC

[1] Independent testing of MOSFET and clamping diodes guarantees against avalanche.



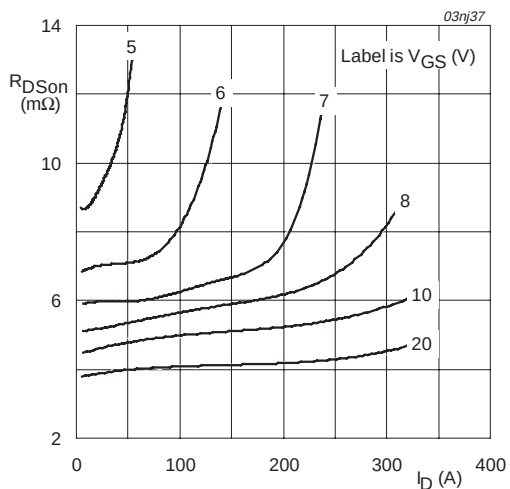
$T_J = 25\text{ }^{\circ}\text{C}; t_p = 300\text{ }\mu\text{s}$

Fig 5. Output characteristics: drain current as a function of drain-source voltage; typical values.



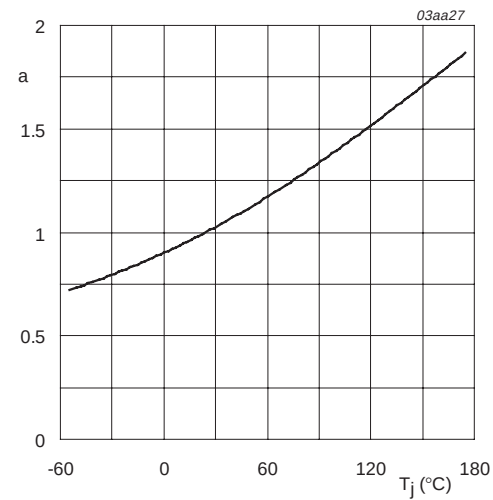
$T_J = 25\text{ }^{\circ}\text{C}; I_D = 30\text{ A}$

Fig 6. Drain-source on-state resistance as a function of gate-source voltage; typical values.



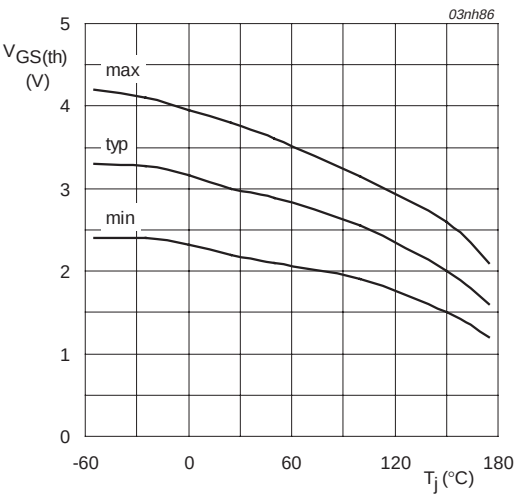
$T_J = 25\text{ }^{\circ}\text{C}; t_p = 300\text{ }\mu\text{s}$

Fig 7. Drain-source on-state resistance as a function of drain current; typical values.



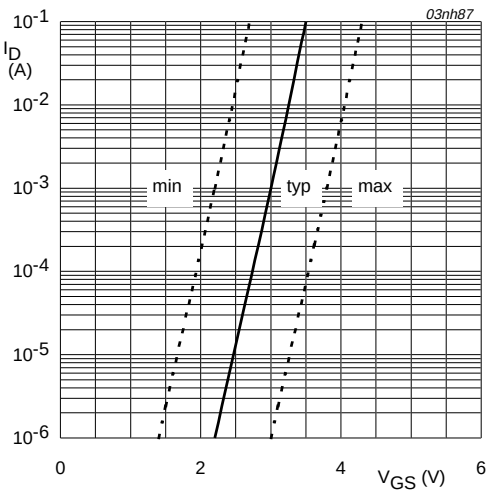
$$a = \frac{R_{DSon}}{R_{DSon(25^{\circ}\text{C})}}$$

Fig 8. Normalized drain-source on-state resistance factor as a function of junction temperature.



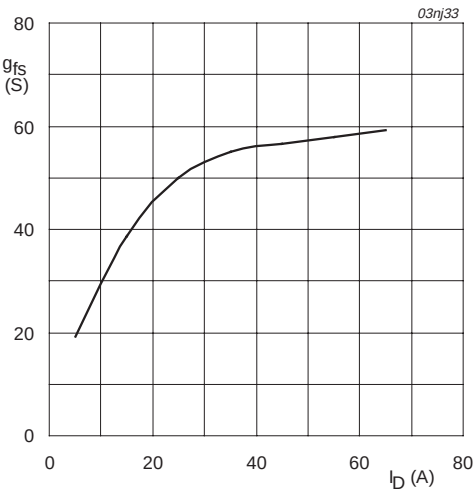
$I_D = 1 \text{ mA}$; $V_{DS} = V_{GS}$

Fig 9. Gate-source threshold voltage as a function of junction temperature.



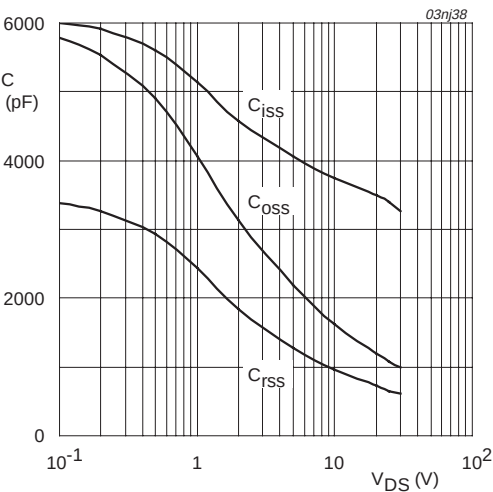
$T_j = 25 \text{ }^{\circ}C$; $V_{DS} = V_{GS}$

Fig 10. Sub-threshold drain current as a function of gate-source voltage.



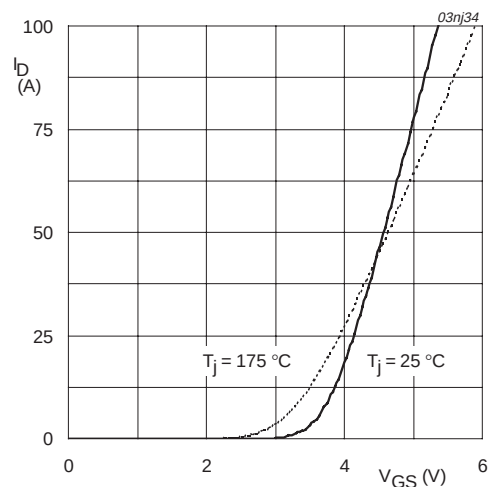
$T_j = 25 \text{ }^{\circ}C$; $V_{DS} = 25 \text{ V}$

Fig 11. Forward transconductance as a function of drain current; typical values.



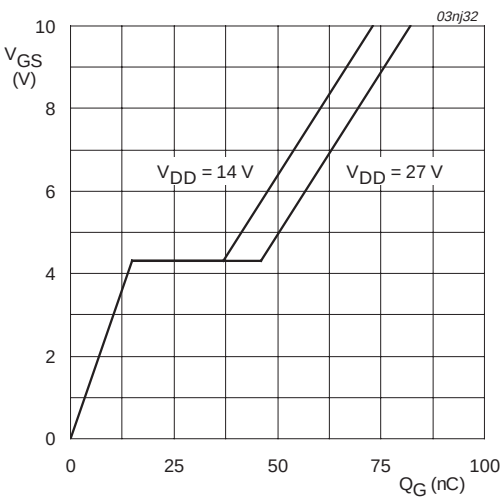
$V_{GS} = 0 \text{ V}$; $f = 1 \text{ MHz}$

Fig 12. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values.



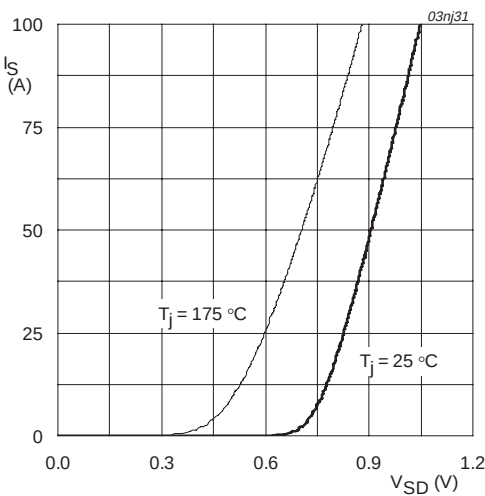
$V_{DS} = 25\text{ V}$

Fig 13. Transfer characteristics: drain current as a function of gate-source voltage; typical values.



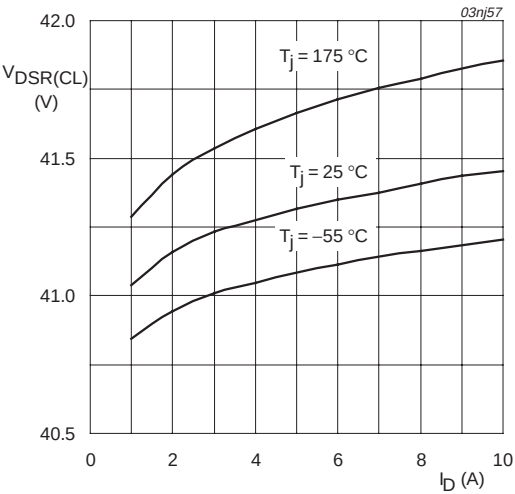
$T_j = 25\text{ °C}; I_D = 25\text{ A}$

Fig 14. Gate-source voltage as a function of gate charge; typical values.



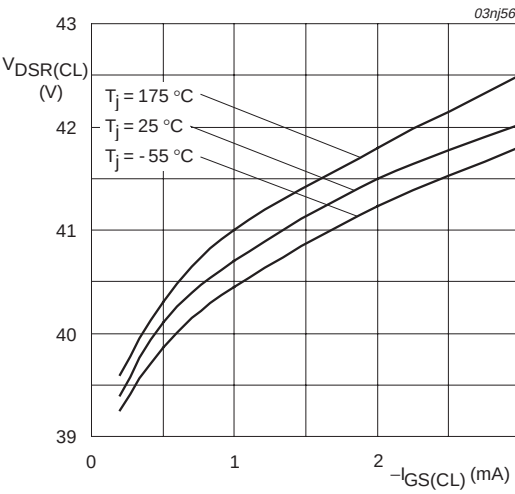
$V_{GS} = 0\text{ V}$

Fig 15. Source (diode forward) current as a function of source-drain (diode forward) voltage; typical values.



$I_{GD(CL)} = -2 \text{ mA}$

Fig 16. Drain-source clamping voltage as a function of drain current; typical values.



$I_D = 10 \text{ A}$

Fig 17. Drain-source clamping voltage as a function of gate-source clamping current; typical values.

7. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3 leads

SOT78C

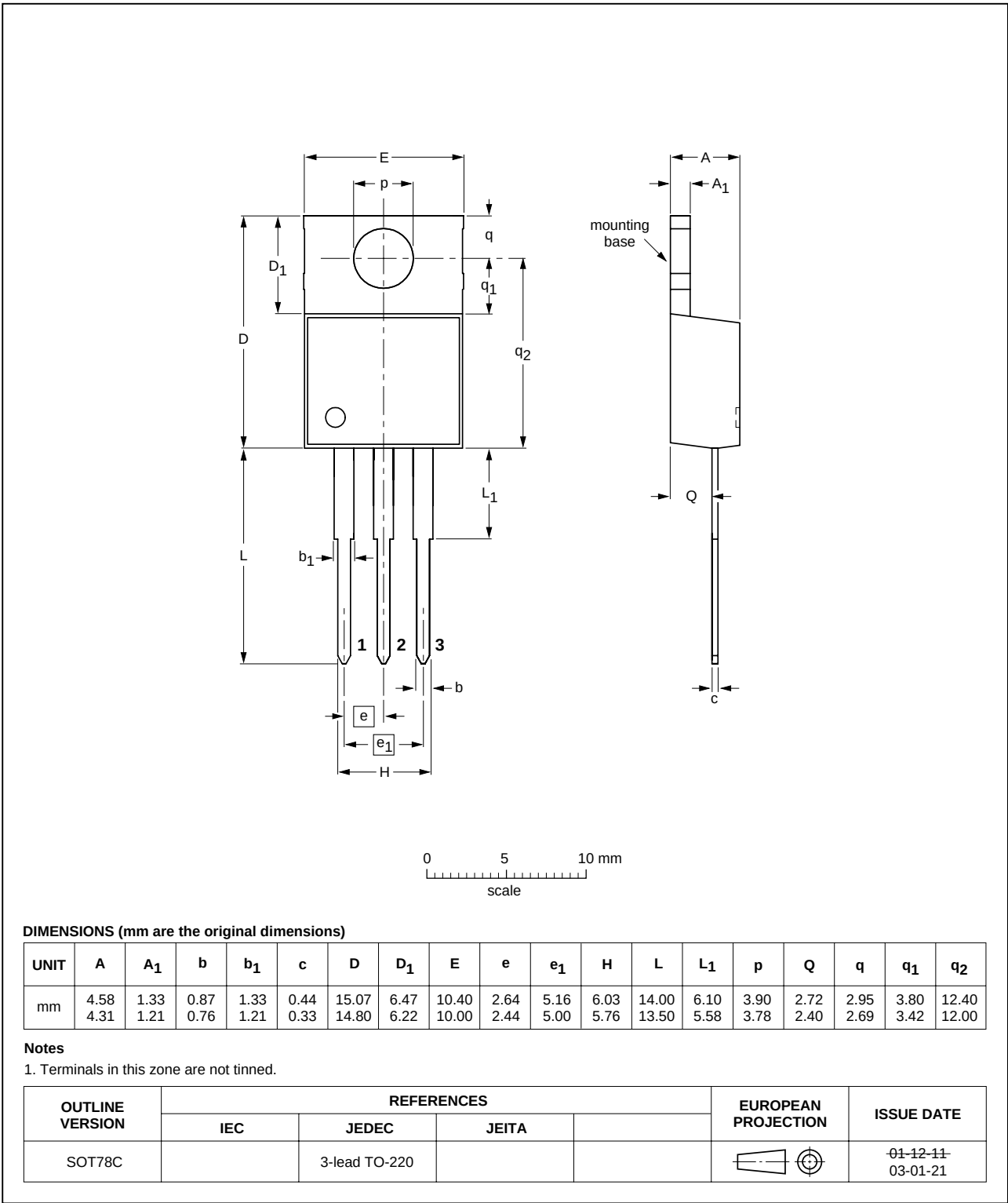


Fig 18. SOT78C (TO-220).

8. Revision history

Table 6: Revision history

Rev	Date	CPCN	Description
03	20031203	-	Product data (9397 750 12162) <ul style="list-style-type: none">Avalanche Ruggedness parameter description in Section 4 changed from: 'non-repetitive drain-source avalanche energy' to 'non-repetitive drain-source clamp energy'.
02	20030521	-	Product data (9397 750 11471) <ul style="list-style-type: none">Typical values of I_{DSS} added to characteristics table, Section 6.
01	20030414	-	Product data (9397 750 11177)

9. Data sheet status

Level	Data sheet status ^[1]	Product status ^{[2][3]}	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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Contact information

For additional information, please visit <http://www.semiconductors.philips.com>.

For sales office addresses, send e-mail to: sales.addresses@www.semiconductors.philips.com.

Fax: +31 40 27 24825

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